

BIOLOGICAL NOTES ON A NEW CHALCID-FLY FROM SEED-LIKE EUCALYPTUS GALLS IN CALIFORNIA<sup>1</sup>

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(Hymenoptera)

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A phytophagous chalcid-fly has been reared from *Eucalyptus* in California and is described as *Flockiella eucalypti* Timberlake (1957) in a companion paper. No phytophagous eucalyptus insects have previously been recorded as introduced into California. The many species of *Eucalyptus* in California have been established from seed, and in this way the rich eucalyptus insect fauna of their native Australian region has largely been left behind. The new chalcid-fly causes formation of seed-like galls in the seed capsules and must have been introduced with seed.

The chalcid-fly *Flockiella eucalypti* Timberlake has been found at the University of California Citrus Experiment Station, Riverside, and at Roeding Park, Fresno, California, the only locations in the state where an extensive search has been made.

The chalcid-fly has been reared only from *Eucalyptus umbellata* (Gaertn.) Domin (1928) as determined by Dr. Mildred E. Mahtias. This species has been known as *Eucalyptus tereticornis* Sm. and is one of the important windbreak trees in California, especially in the hotter, drier areas where the blue gum, *Eucalyptus globulus* Labill., does not thrive.

*Eucalyptus umbellata* is a large tree, growing to a height of about 100 feet. The bark is gray and deciduous, and the leaves are long and slender. The seed capsules are hemispherical, with protruding valves; they are less than 6 mm. in diameter and are formed in clusters of four to eight. The pedicels are less than three times as long as the capsule. The cap is conical, sharp-pointed, and usually two to three times as long as the capsule. The seeds are distinctive, being irregular, partially hollow, and about 1 mm. in diameter.

The adult chalcid-fly is largely dark brassy green, with yellow legs banded with brown. The flies are variable in size, ranging from approximately 1 mm. to 1.8 mm. in length. The adult is active, hops when disturbed, and flies readily. It can live for several days without food or water. No males are produced.

The egg is deposited in small flower buds. Some of the nearby

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twigs have been found to be thickened and distorted as if by oviposition injury, but no larvae have been found in them.

The larva is found in a saclike gall which it causes to grow in one of the four cells of the bud. In the early stages this gall is pale green and soft; it enlarges rapidly, however, and before the anthers have become exposed it has occupied most of the cell and replaced the ovules. Especially in the early stages, the cavity in the gall is much larger than the gall insect. When the gall reaches its final size it is thin but hard and is nearly spherical; in color it is light brown with darker markings. The gall resembles the seed and is about one and one-half times as large in diameter.

When the capsule opens, a few of the chalcid-fly galls drop out with the seeds. The majority of the galls remain in the capsule and some of them are permanently attached to its walls. Usually there are one to three galls in a capsule and one gall in a cell. There may be two galls in a cell, however, and six have been found in one capsule. The incidence of infested capsules was greater in October and November than in early spring, but infested capsules were found all year.

The chalcid-fly may emerge from the gall by chewing a circular hole in it. It may also chew a hole to the surface of the seed capsule while it is still green. In this case the gall will be nearly filled with frass from the capsule. The adult fly can then escape from the seed capsule before it opens. At least when the capsule is removed from the tree the adult usually escapes from the capsule after it opens. The chalcid-flies may emerge from the galls over a period of nearly two months after removal from the tree. The galls could be gathered with seed and carried to new locations with the seed or seed capsules. This is presumably the way in which the chalcid-fly was brought into California.

In the fall of 1953 and the spring and summer of 1954 this phytophagous chalcid-fly was extremely abundant in seed capsules from one tree but extremely rare on those from other trees. No parasites were found at that time. However, seed capsules from the same tree collected on March 15, 1955 were heavily parasitized. A small number of capsules collected then yielded seventy-two chalcid-flies as compared to seventy-five gall chalcid-flies. It appears probable that this parasite is ordinarily very efficient in controlling its host.

This insect is probably not of economic importance. The

chalcid-fly was first noticed after seed capsules gathered in October 1953 failed to yield viable seed, but at other times and on other trees, a low percentage has been found to be infested. A closely related chalcid-fly, *Rhcnopeltella eucalypti* Gahan (1922), which causes formation of stem galls (Miller, 1921) has almost destroyed the blue gum, *Eucalyptus globulus* Labill., in New Zealand, where the tree had been an important timber tree before the introduction of the insect (Clark, 1938). That chalcid-fly was present for some time before its discovery but the damage was mistaken for that of a fungus.

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CERCERINI COLLECTION NOTES, I.

(Hymenoptera: Sphecidae)

*EUCERCERIS SINUATA* Scullen

In 1939, this species was described (Oregon State Monog., Studies in Ent. 1:47) from a single female specimen collected at Devils River, Texas, May 5, 1907, on sumach, by F. C. Bishop. Recently, a second female specimen of the above species was found in a collection from the University of California (Berkeley). This specimen was collected at Leon Creek, Bexar County, Texas, Oct. 11, 1952 by B. J. Adelson. The male of this species is unknown.

*EUCERCERIS BRUNNEA* Scullen

In 1947, this species was described (Pan-Pacific Ent. 24:159-60) from a single female specimen collected at Jacala, Hidalgo, Mexico, 4,500 feet, June 22, 1936, by Ralph Haag. A second female specimen of this species was recently found in a collection